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other things, that the operating street railways in that year paid (or accrued) for interest deductions an amount equal to 12.43 per cent. of their revenues; for rent deductions, 15.96 per cent.; and carried to the surplus account 12.14 per cent. Taxes accounted for 6.56 per cent. and operating expenses, for 54.92 per cent. of revenues. Other deductions took 0.50 per cent. The total of these items adds to more than 100 per cent. because the companies derived a net amount from other than street-railway operations equal to 2.51 per cent. of operating revenues. The extent to which compensation to officers and employees accounts for the 55 per cent. operating ratio is not shown in this table, because the classification of operating expenses does not keep such charges separate, though such procedure would certainly be highly desirable from a statistical viewpoint. The ratios stop with the surplus for the year, as does the income account. Theoretically this is practically all available for dividends. An intensive study of Professor Nearing's problem would have to consider just how far this view needs to be qualified in the long run. If a surplus is accumulated from undivided profits, is the property income less merely because profits are saved and reinvested by the corporation instead of being paid out to the stockholder, perhaps by him to be saved and reinvested? There is also the question as to whether depreciation has been adequately provided for before the figure of net income for the year is obtained. Still there remains the pervasive and evasive matter of intercorporate relations and their effects upon totals.

A statistical study of the sort Professor Nearing has undertaken requires careful attention to the economic and accounting relations that underlie the figures used. It is for lack of care in these respects, even more than for his too hasty use of sources that he is to be criticized.

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WHY DISTRIBUTIVE PERCENTAGES AS PUBLISHED IN THE REPORTS OF THE BUREAU OF THE CENSUS DO NOT INVARIABLY ADD TO 100.

In an article contributed to the December issue of the *QUARTERLY PUBLICATIONS*, the Bureau of the Census is stigmatized as guilty of "carelessness" or "slovenliness" because of the fact that in the reports of that Bureau, distributive or constituent percentages do not always add to 100.0. The Bureau was well aware of this fact. It results from a deliberate policy which it seems necessary to explain now that it has been made the subject of public criticism, even though the explanation is a matter of very elementary mathematics. Persons interested in the question may then judge for themselves whether the practice of the Bureau is right or wrong.

In Census work, percentages are expressed with decimal remainders carried out to one place. Thus the percentage which 125 is of 1000 would

be expressed as 12.5. Usually, however, percentages so expressed are not, as in this instance, exact. They are approximations and being approximations they will not invariably add to 100.0 unless they are adjusted so as to make them add to that. A simple illustration will show this. Take the following in which each item is exactly one-third of the total:

Items.	Amounts.	Per Cent. of Total.
A.....	422	33.3
B.....	422	33.3
C.....	422	33.3
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Total.....	1,266	100.0

Here the percentages add to 99.9, yet each percentage is as nearly exact as it can be when carried out to only one decimal place. If, in order to make these percentages add to 100.0, one of these percentages is changed to 33.4 it becomes less exact than it was before, the exact percentage in each instance being nearer 33.3 than 33.4.

Although the constituent percentages in the above example add to 99.9 the percentage for the total is nevertheless given as 100.0 mainly for the reason that 100.0 is the true percentage and absolutely exact. It is just what it purports to be, viz., the percentage which the total is of the total. Furthermore, expressed as 100.0, it has the practical advantage of indicating to the reader that the percentages given above are the percentages which the items form of the total, 1266.

In view of this fact that percentages which have been adjusted so as to add to 100.0 are less exact than they were before the adjustment was made the Bureau of the Census some years ago deliberately abandoned the practice of adjusting percentages. Incidentally, however, the change was in the interests of economy as well as accuracy, for when, as is so often the case in census work, a large number of items are given, the adjustment, which must be made according to prescribed rules, involves considerable clerical labor.

JOSEPH A. HILL.

MECHANICAL DEVICES IN EUROPEAN STATISTICAL WORK.

To those familiar with the development of statistical methods it is well known that the introduction of mechanical devices for performing the clerical work has been one of the important factors in extending the range and improving the quality of the results in recent years. Not only is accuracy improved, due to the fact that machines do not make mistakes, a point in which they differ in an astonishing degree from the human organism, but of equal or greater importance is the extension in the quantity and complexity of statistical work which the mechanical methods